UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/325,099	06/03/1999	ALEXANDER SHVARTS	4498	2396

7590 04/07/2003

MATTHEW E CONNORS
SAMUELS GAUTHIER & STEVENS LLP
225 FRANKLIN STREET
SUITE 3300
BOSTON, MA 02110

EXAMINER
FAN, CHIEH M

ART UNIT	PAPER NUMBER
2634	10

DATE MAILED: 04/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/325,099	SHVARTS ET AL.	
	Examiner	Art Unit	
	Chieh M Fan	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *9/25/02 and 1/21/03* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5,7-12,14 and 16-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5,7-12,14 and 16-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on *21 January 2003* is: a)☒ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

1. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on 1/21/03 have been approved. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. Claims 1, 5, 7-10, 14, and 16-19 are rejected under 35 U.S.C. 102(a) as being anticipated by Herzinger (EP 0,905,879, an English abstract is also attached).

Regarding claim **1**, Herzinger discloses a translation loop modulator (see Fig. 2 and the English abstract) for transmission circuit in a communication system, said translation loop modulator comprising:

input modulation means ("QM" and "BP" in Fig. 2) for receiving at least one input signal ("f_I" and "f_Q" in Fig. 2) that is representative of information to be modulated, for

receiving a feedback signal ("f_{MO}" in Fig. 2), and for producing an intermediate modulated signal (output from "BP" in Fig. 2) responsive to said input signal and said feedback signal;

comparator means ("FT1", "FT2", "PFD", "CP", "LF" and "HF-VCO" in Fig. 2) for receiving said intermediate modulated signal (output from "BP" in Fig. 2) and a reference signal ("f_{LO}" in Fig. 2) having a frequency of F_{LO}, and for producing an output transmission signal ("A" in Fig. 2) having a frequency of F_{OUT} responsive to said intermediate modulated signal and said reference signal, wherein said comparator means includes a first frequency divider unit ("FT1" in Fig. 2) for providing a to divide by m function and a second frequency divider unit ("FT2" in Fig. 2) for providing a divide by n function such that $F_{LO} = F_{OUT} / (1 \pm m/n)$ (see the mathematical expression in col. 4, line 49, also see right column on page 3 of the English translation of DE 19743207 provided by the applicant), and

feedback circuitry ("M1" and "TP" in Fig. 2) coupled to said output transmission signal ("A" in Fig. 2), coupled to said reference signal ("f_{LO}" in Fig. 2) and coupled to said input modulation means ("QM" and "BP" in Fig. 2), said feedback circuitry for producing said feedback signal ("f_{MO}" in Fig. 2) responsive to said output transmission signal and said reference signal.

Regarding claim **5**, Herzinger also teaches an input port of said second frequency divider unit ("FT2" in Fig. 2) is coupled to said reference signal ("f_{LO}" output from "LO" in Fig. 2), and an output port of said second frequency divider unit is coupled to a phase comparator device ("PFD" in Fig. 2).

Regarding claim **7**, Herzinger also teaches an input port of said first frequency divider unit ("FT1" in Fig. 2) is coupled to said intermediate modulated signal (the output from "BP" in Fig. 2), and said output port of said first frequency divider unit is coupled to a phase comparator device ("PFD" in Fig. 2).

Regarding claim **8**, Herzinger also teaches said feedback circuitry ("M1" and TP" in Fig. 2) includes a mixer device ("M1" in Fig. 2) including a first input port coupled to said output transmission signal ("A" in Fig. 2), a second input port coupled to said reference signal ("f_{LO}" in Fig. 2), and an output port coupled to said feedback signal ("f_{MO}" in Fig. 2).

Regarding claim **9**, Herzinger also teaches said reference signal is directly connected to said mixer device (as seen in Fig. 2, the reference signal "f_{LO}" is directly connected to the mixer device "M1").

Regarding claim **10**, Herzinger teaches a translation loop modulator (see Fig. 2 and the English abstract) for a transmission circuit in a communication system, said translation loop modulator comprising:

quadrature modulation means ("QM" and "BP" in Fig. 2) for receiving at least one input signal ("f_I" and "f_Q" in Fig. 2) that is representative of information to be modulated, for receiving a feedback signal ("f_{MO}" in Fig. 2), and for producing an quadrature modulated signal (output from "BP" in Fig. 2) responsive to said input signal and said feedback signal;

phase comparator means ("FT1", "FT2", "PFD", "CP", and "LF" in Fig. 2) for receiving said quadrature modulated signal (output from "BP" in Fig. 2) and a reference

signal ("f_{LO}" in Fig. 2) having a frequency F_{LO}, and for producing a phase comparator signal (output from "LF" in Fig. 2) responsive to said quadrature modulated signal and said reference signal, said phase comparator means including a first frequency divider unit ("FT1" in Fig. 2) for providing a divide by m function and a second frequency divider unit ("FT2" in Fig. 2) for providing a divide by n function;

oscillator means ("HF-VCO" in Fig. 2) for receiving said phase comparator signal (output from "LF" in Fig. 2), and for producing an output transmission signal ("A" in Fig. 2) responsive to said phase comparator signal, said output transmission signal having a frequency F_{OUT} wherein $F_{OUT} = F_{LO}$ $(1 \pm m/n)$ (see the mathematical expression in col. 4, line 49, also see right column on page 3 of the English translation of DE 19743207 provided by the applicant); and

feedback circuitry ("M1" and "TP" in Fig. 2) coupled to said output transmission signal ("A" in Fig. 2), coupled to said reference signal ("f_{LO}" in Fig. 2) and coupled to said quadrature modulation means ("QM" and "BP" in Fig. 2), said feedback circuitry for producing said feedback signal ("f_{MO}" in Fig. 2) responsive to said output transmission signal and said reference signal.

Regarding claim **14**, Herzinger also teaches an input port of said second frequency divider unit ("FT2" in Fig. 2) is coupled to said reference signal ("f_{LO}" output from "LO" in Fig. 2), and an output port of said second frequency divider unit is coupled to a phase comparator device ("PFD" in Fig. 2).

Regarding claim **16**, Herzinger also teaches an input port of said first frequency divider unit ("FT1" in Fig. 2) is coupled to said intermediate modulated signal (the output

from "BP" in Fig. 2), and an output port of said first frequency divider unit is coupled to a phase comparator device ("PFD" in Fig. 2).

Regarding claim **17**, Herzinger also teaches said feedback circuitry ("M1" and TP" in Fig. 2) includes a mixer device ("M1" in Fig. 2) including a first input port coupled to said output transmission signal ("A" in Fig. 2), a second input port coupled to said reference signal ("f_{LO}" in Fig. 2), and an output port coupled to said feedback signal ("f_{MO}" in Fig. 2).

Regarding claim **18**, Herzinger also teaches said reference signal is directly connected to said mixer device (as seen in Fig. 2, the reference signal "f_{LO}" is directly connected to the mixer device "M1").

Regarding claim **19**, Herzinger teaches a translation loop modulator (see Fig. 2 and the English abstract) for a transmission circuit in a communication system, said translation loop modulator comprising:

quadrature modulation means ("QM" and "BP" in Fig. 2) for receiving at least one input signal ("f_I" and "f_Q" in Fig. 2) that is representative of information to be modulated, for receiving a feedback signal ("f_{MO}" in Fig. 2), and for producing an quadrature modulated signal (output from "BP" in Fig. 2) responsive to said input signal and said feedback signal;

first frequency divider means ("FT1" in Fig. 2) for receiving said quadrature modulated signal (output from "BP" in Fig. 2), and for producing a first frequency divided signal (output from "FT1" in Fig. 2) responsive to said quadrature modulated signal such that said first frequency divider means provides a divide by m function;

second frequency divider means ("FT2" in Fig. 2) for receiving a reference signal ("f_{LO}" in Fig. 2), and for producing a second frequency divided signal ("f_{PD}" in Fig. 2) responsive to said reference signal such that said first frequency divider means provides a divide by n function;

phase comparator means ("PFD", "CP", and "LF" in Fig. 2) for receiving said first frequency divided signal and said second frequency divided signal, and for producing a phase comparator signal (output from "LF" in Fig. 2) responsive to said first and second frequency divided signals;

oscillator means ("HF-VCO" in Fig. 2) for receiving said phase comparator signal (output from "LF" in Fig. 2), and for producing an output transmission signal ("A" in Fig. 2) having a frequency F_{OUT} responsive to said phase comparator signal such that $F_{OUT} = F_{LO}(1 \pm m/n)$ (see the mathematical expression in col. 4, line 49, also see right column on page 3 of the English translation of DE 19743207 provided by the applicant); and

feedback circuitry ("M1" and "TP" in Fig. 2) coupled to said output transmission signal ("A" in Fig. 2), coupled to said reference signal ("f_{LO}" in Fig. 2) and coupled to said quadrature modulation means ("QM" and "BP" in Fig. 2), said feedback circuitry for producing said feedback signal ("f_{MO}" in Fig. 2) responsive to said output transmission signal and said reference signal.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 2, 3, 11, 12 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Herzinger (EP 0,905,879) in view of Jaffe (US Patent 5,130,670).

Regarding claim **2**, Herzinger teaches the claimed invention (see the rationale applied to claim 1 above) including an oscillating means ("LO" in Fig. 2) for generating the reference signal ("f_{LO}" in Fig. 2), but fails to teach that the oscillating means is a reference loop modulator, i.e., a feedback loop configuration.

Jaffe teaches that an oscillating means (16' in Fig. 4) is implemented with a phase locked loop (52', 54', 56', 58', 66, 64', 60' and 62' in Fig. 7). The phase locked loop comprises a stability enhancement circuit (66 in Fig. 7) so as to generate a stable output oscillating signal.

It is desirable to generate a stable reference signal in the translation loop modulator of Herzinger so as to generate a stable output transmission signal ("A" in Fig. 2 of Herzinger). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the oscillating means of Herzinger with a phase locked loop, as taught by Jaffe, so as to generate a stable reference signal and consequently to generate a stable output transmission signal.

Regarding claim **3**, Jaffe teaches the claimed limitation "said reference loop modulator includes a fractional n synthesizer" because Jaffe teaches that the oscillating means 16' is a fractional n synthesizer (col. 16, lines 62-63).

Regarding claim **11**, Herzinger teaches the claimed invention (see the rationale applied to claim 10 above) including an oscillating means ("LO" in Fig. 2) for generating the reference signal ("f_{LO}" in Fig. 2), but fails to teach that the oscillating means is a reference loop modulator, i.e., a feedback loop configuration.

Jaffe teaches that an oscillating means (16' in Fig. 4) is implemented with a phase locked loop (52', 54', 56', 58', 66, 64', 60' and 62' in Fig. 7). The phase locked loop comprises a stability enhancement circuit (66 in Fig. 7) so as to generate a stable output oscillating signal.

It is desirable to generate a stable reference signal in the translation loop modulator of Herzinger so as to generate a stable output transmission signal ("A" in Fig. 2 of Herzinger). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the oscillating means of Herzinger with a phase locked loop, as taught by Jaffe, so as to generate a stable reference signal and consequently to generate a stable output transmission signal.

Regarding claim **12**, Jaffe teaches the claimed limitation "said reference loop modulator includes a fractional n synthesizer" because Jaffe teaches that the oscillating means 16' is a fractional n synthesizer (col. 16, lines 62-63).

Regarding claim **20**, Herzinger teaches the claimed invention (see the rationale applied to claim 19 above) including an oscillating means ("LO" in Fig. 2) for generating the reference signal ("f_{LO}" in Fig. 2), but fails to teach that the oscillating means is a reference loop modulator, i.e., a feedback loop configuration.

Jaffe teaches that an oscillating means (16' in Fig. 4) is implemented with a phase locked loop (52', 54', 56', 58', 66, 64', 60' and 62' in Fig. 7). The phase locked loop comprises a stability enhancement circuit (66 in Fig. 7) so as to generate a stable output oscillating signal.

It is desirable to generate a stable reference signal in the translation loop modulator of Herzinger so as to generate a stable output transmission signal ("A" in Fig. 2 of Herzinger). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the oscillating means of Herzinger with a phase locked loop, as taught by Jaffe, so as to generate a stable reference signal and consequently to generate a stable output transmission signal.

Response to Arguments

6. Applicant's arguments filed 9/25/02 (PTO Paper #6) have been fully considered but they are not persuasive.

On page 6 of the amendment, the applicant argues that EP 905879 does not teach $F_{OUT} = F_{LO}(1 \pm m/n)$. The EP 905879 reference only teaches $F_{LO} = F_{VCO}/(R-N)$.

Examiner's response --- The EP 905879 reference teaches (see col. 4, line 49) that

$$F_{VCO} = F_{LO} \bullet (R-N) : R.$$

That is, F_{VCO} is equal to the ratio of $F_{LO} \bullet (R-N)$ and R. Therefore, F_{VCO} is equal to $F_{LO} \bullet (R-N) / R$. After simple mathematical manipulation, it is clear that

$$F_{VCO} = F_{LO} \bullet (1 - N/R).$$

Therefore, the EP 905879 teaches the claimed limitation.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chieh M Fan whose telephone number is (703) 305-0198. The examiner can normally be reached on Monday-Friday 8:00AM-5:30PM, Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (703) 305-4714. The fax phone numbers

for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4750.

Chieh M Fan
Examiner
Art Unit 2634

cmf
March 28, 2003

STEPHEN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600